



ORTHOS LIDAR REMOTE SENSING ELEVATION MODELS CONTOURS INFRARED DATA CONVERSION ANALOG & DIGITAL MAPPING 3D MODELS GROUND BASED LASER MAPPING TRAINING



Total Geographic Solutions

# Sanborn - NAIP 2009 Summary

**Date:** December 10, 2009

**Location:** APFO

*Presented by: Steve Ashbee, Program Manager  
Jason Caldwell, Director of Strategic Accounts*

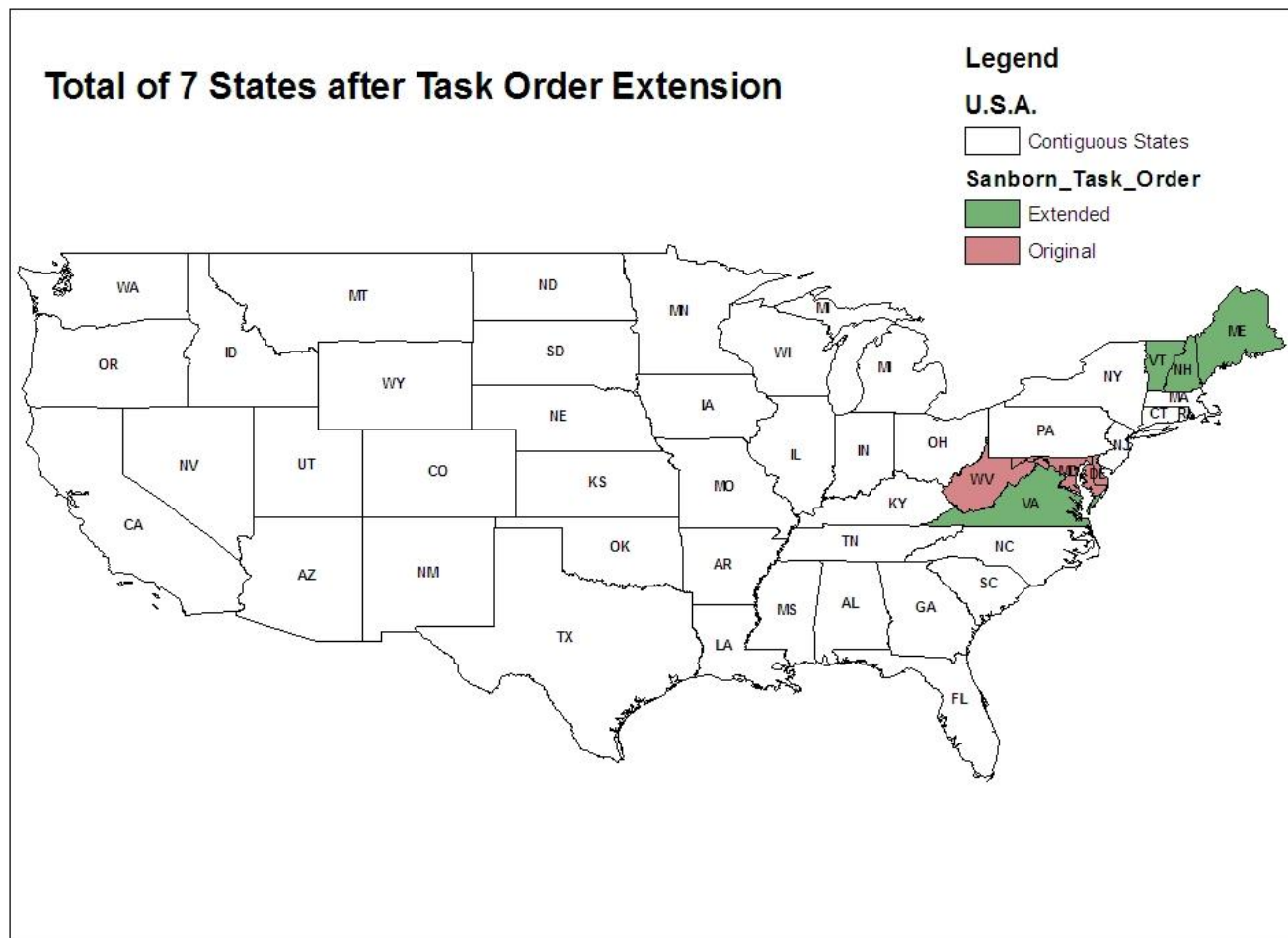


# Agenda



Project Overview  
Sanborn Team & Resources  
Plan vs. Actual  
Performance Review  
Factors Affecting Acquisition  
Lessons Learned  
Comments/Suggestions

# Project Overview



# Project Overview

State	Total DOQQs	Total CCMs	Imagery Type	UTM Zones	Copies CCM	CCM Format	Total Sq. Mi.
NH	771	10	RGB	18,19	4	MrSID	10,425
ME	2,748	16	RGB	19	4	MrSID	36,082
VT	812	14	RGB	18,19	4	MrSID	10,901
DE	176	3	RGBNIR	18	4	JP2	2,550
MD	901	24	RGBNIR	17,18	5	JP2	13,066
VA	3,029	100	RGB	17,18	4	MrSID	44,857
WV	1,831	55	RGB	17,18	4	MrSID	26,664
<b>Project Totals</b>	<b>10,268</b>	<b>222</b>					<b>144,545</b>

- Direct to digital image acquisition
- 1 meter pixel resolution
- Absolute Horizontal Accuracy requirement of 6.0 m @ NSSDA defined 95% confidence

# Sanborn Resources

- Colorado Springs & Charlotte production facilities for processing
  - Back up production at St. Louis
  - Flight resources primarily COS and CHA and 2 subcontractors
  - Backup flight resources included St. Louis and 2 alternate subcontractors
  - One flight sub initially awarded some production processing as part of flight sub package – failed

# Sanborn Team & Resources

- Acquisition Resources

Resource Source	Aircraft Type	Engine	Camera Type
Sanborn - COS	Aero Commander 680W	Turbine	DMC
Sanborn - COS	Cessna - Navajo	Piston	DMC
Sanborn - STL	Cessna - Navajo	Piston	DMC
Sanborn - CHA	Cessna - Navajo	Piston	DMC
Subcontractor A	Cessna 441 - Conquest	Turbine	UltraCam
Subcontractor A	Cessna - Navajo	Piston	UltraCam
Subcontractor A	Cessna - Navajo	Piston	UltraCam
Subcontractor B	Cessna 441 - Conquest	Turbine	DMC
Alternate Sub 1	Aero Commander 690B	Turbine	DMC
Alternate Sub 2	Cessna 441 - Conquest	Turbine	DMC
Alternate Sub 3 * Added to prog.	Aero Commander 980	Turbine	DMC

# Plan vs. Actual

- The Plan – Acquisition
  - Divide task order by geographic region for mission assignment and execution purposes
    - NE Plan
    - Mid-Atlantic Plan
  - Use one camera type for each region

# Plan vs. Actual

- The Plan – Acquisition - Actual

Resource Source	Photo Stations Northeast Plan	Photo Stations Northeast Actual	Photo Stations Mid-Atlantic Plan	Photo Stations Mid-Atlantic Actual
Subcontractor A	16,720	16,720		
Sanborn			11,328	12,320
Subcontractor B			4,642	1,997
Subcontractor-Alternate 1				200
Subcontractor-Alternate 2				513
Subcontractor-Alternate 3				892
Total	16,720	16,720	15,970	15,970



# Plan vs. Actual

- Processing – Actual
  - Image Processing
  - AGPS Processing & AT (as required)
  - Orthophoto production (used USGS 2009 NED)

State	Total DOQQs	Total CCMs	Total Sq. Mi.	UTM Zones	Processing Resource Plan	Processing Resource Actual
NH	771	10	10,425	18,19	Subcontractor	Alt. Subcontractor
ME	2,748	16	36,082	19	Sanborn COS	Sanborn COS
VT	812	14	10,901	18,19	Subcontractor	Alt. Subcontractor
DE	176	3	2,550	18	Sanborn COS	Sanborn COS
MD	901	24	13,066	17,18	Sanborn COS	Sanborn COS
VA	3,029	100	44,857	17,18	Sanborn CHA	Sanborn CHA
WV	1,831	55	26,664	17,18	Sanborn COS	Sanborn CHA
<b>Project Totals</b>	<b>10,268</b>	<b>222</b>	<b>144,545</b>			

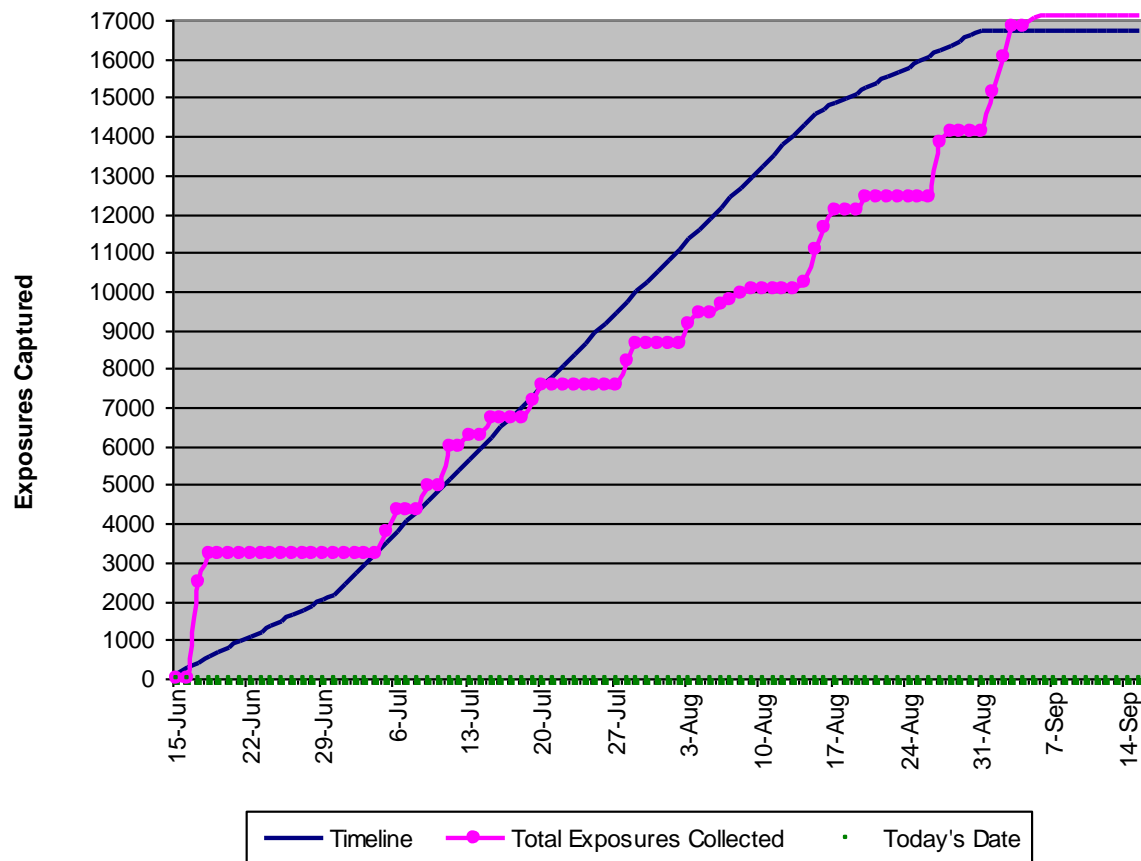
- Actual sub < 15% - VT, NH ortho production only

# Performance Review



- NE Acquisition – one extension granted for VT, NH to 9-15

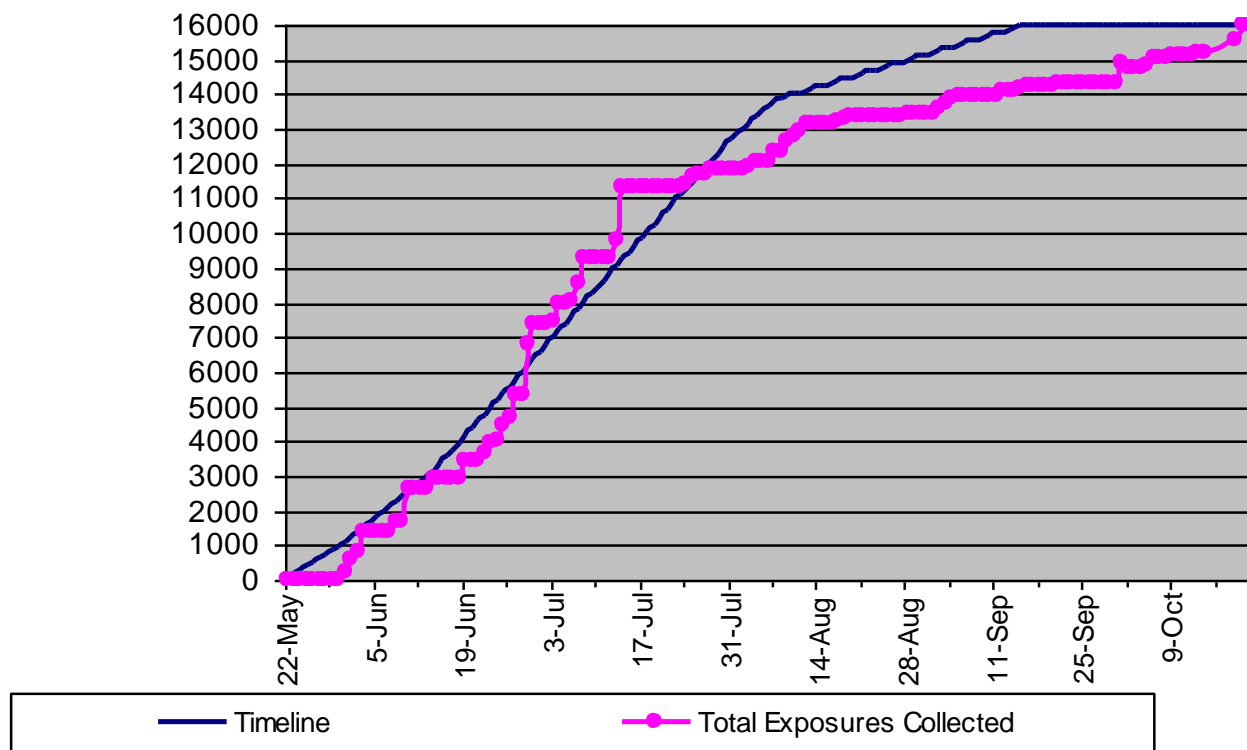
NAIP New England Flight Progress 2009



# Performance Review

- Mid-Atlantic Acquisition – extensions required for WV, VA & MD

NAIP Mid Atlantic Flight Progress 2009



# Performance Review - Processing

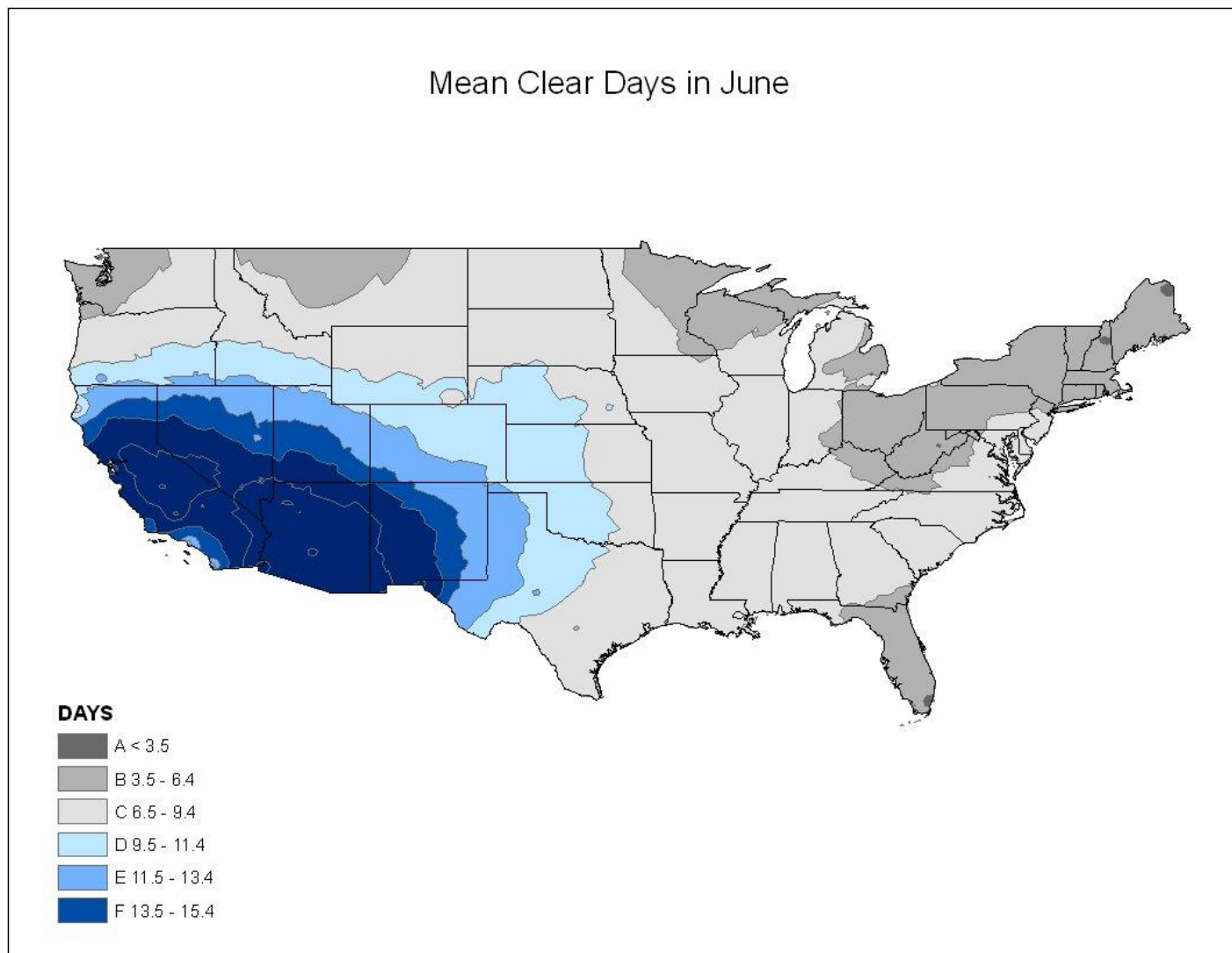
State	Total DOQQs	Total CCMs	Total Sq. Mi.	Final Due Date	Start of Incremental Del.	Completion of Deliveries	Acc. Test @ NSSDA 95%
NH	771	10	10,425	15-Oct-09	N/A	15-Oct-09	2.68
ME	2,748	16	36,082	15-Oct-09	10-Oct-09	15-Oct-09	3.99
VT	812	14	10,901	15-Oct-09	N/A	15-Oct-09	4.55
DE	176	3	2,550	14-Sep-09	N/A	14-Sep-09	2.85
MD	901	24	13,066	14-Nov-09	4-Nov-09	14-Nov-09	2.88
VA	3,029	100	44,857	14-Nov-09	8-Sep-09	14-Nov-09	4.36
WV	1,831	55	26,664	14-Nov-09	6-Oct-09	14-Nov-09	3.01

# Factors Affecting Acquisition

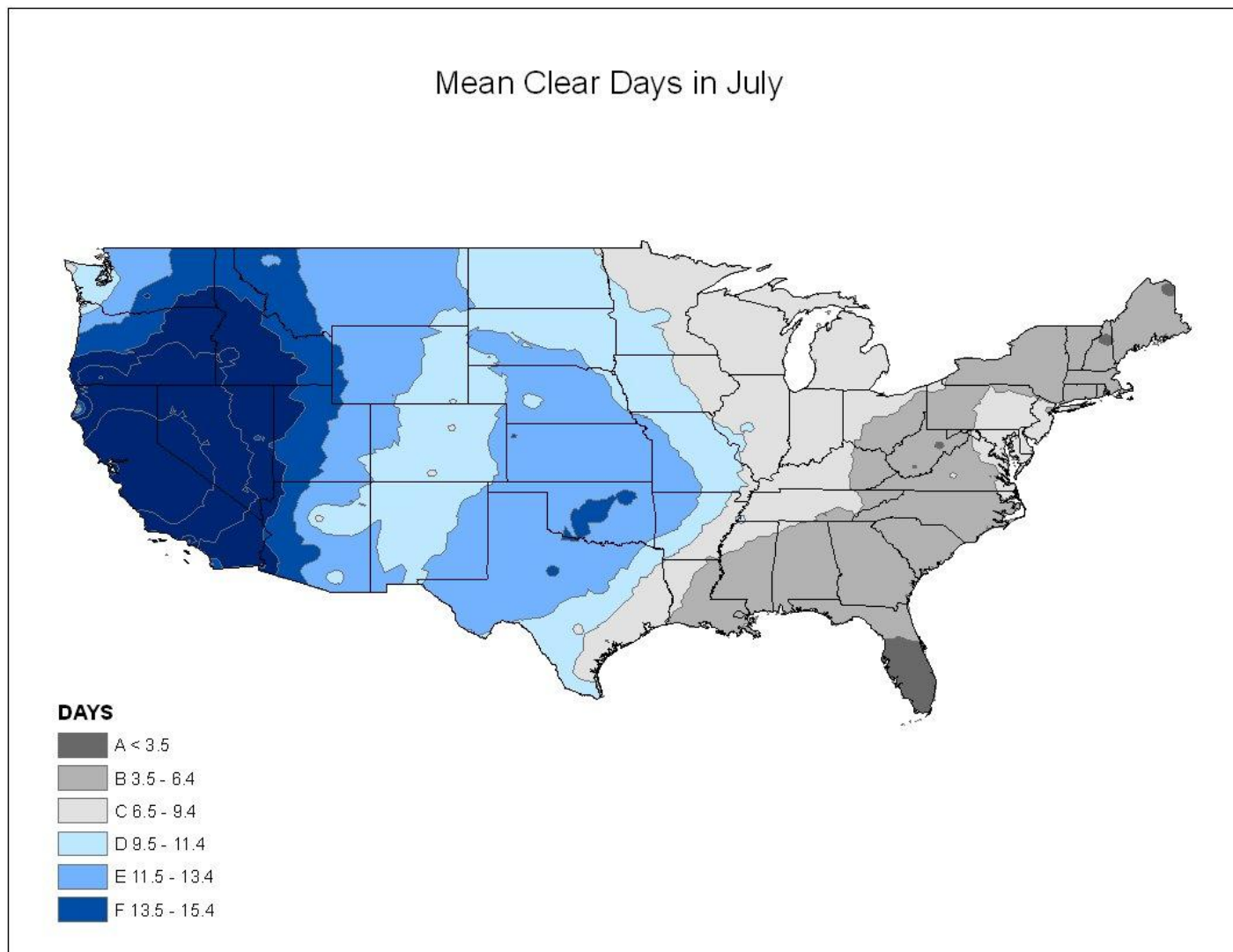


- Weather
  - Average clear days low in states awarded
  - 2009 conditions worse than average
  - NOAA charts show number of clear days (defined as days with 0-20% cloud cover)
- Flight Restrictions
  - Prohibited or restricted zones
  - ATC directives with respect to proximity of aircraft to one another

# Factors Affecting Acquisition



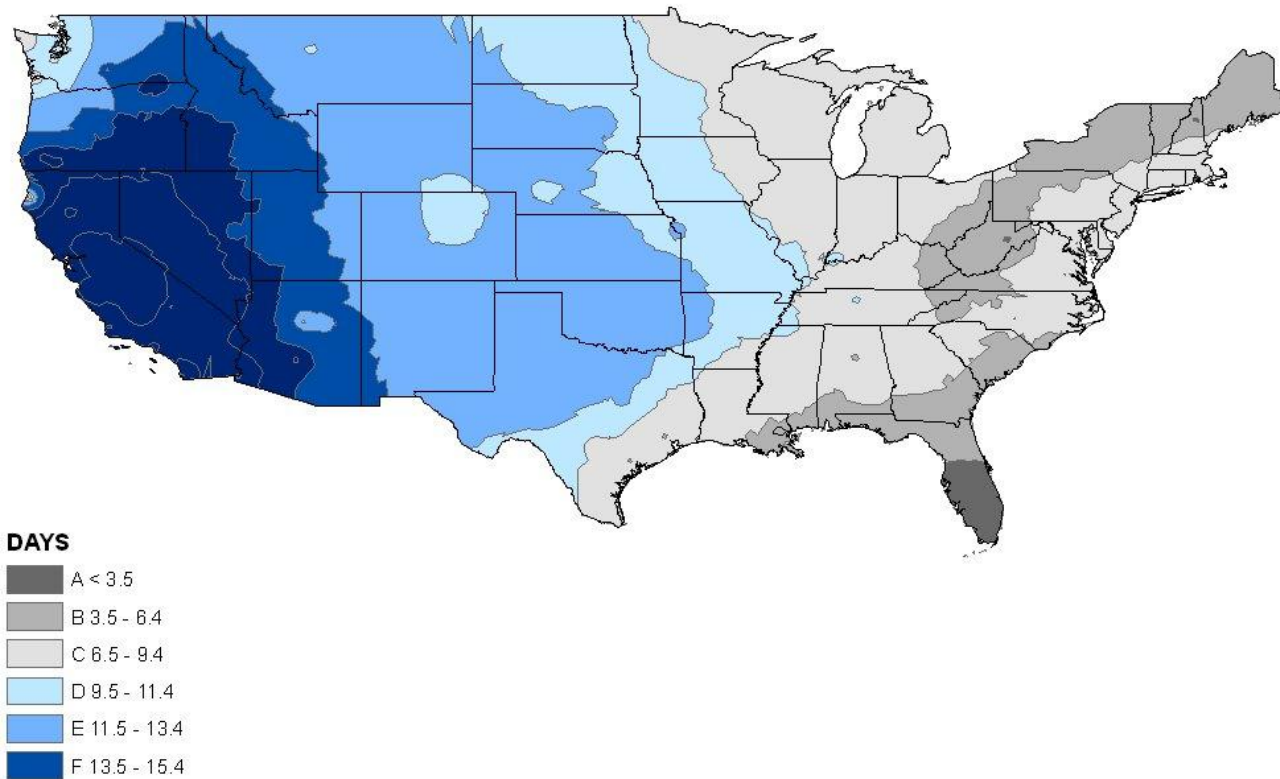
# Factors Affecting Acquisition





# Factors Affecting Acquisition

Mean Clear Days in August

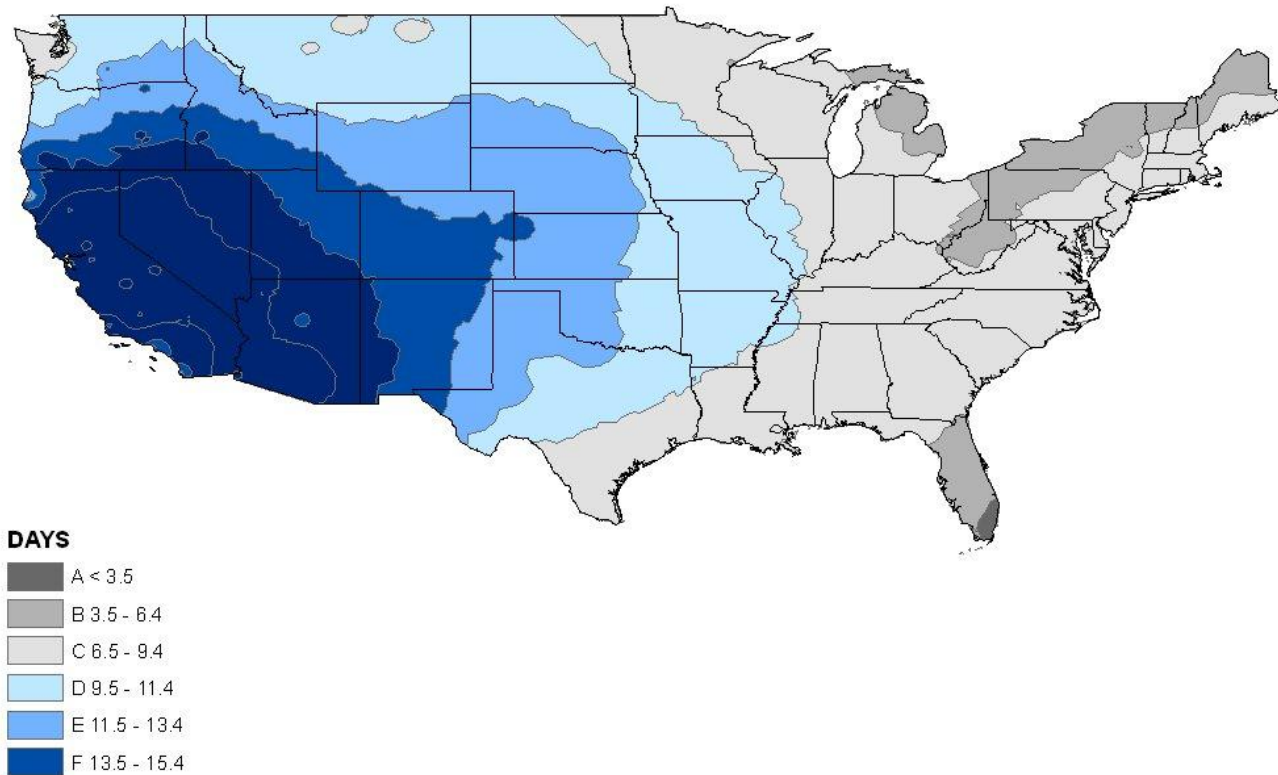




# Factors Affecting Acquisition

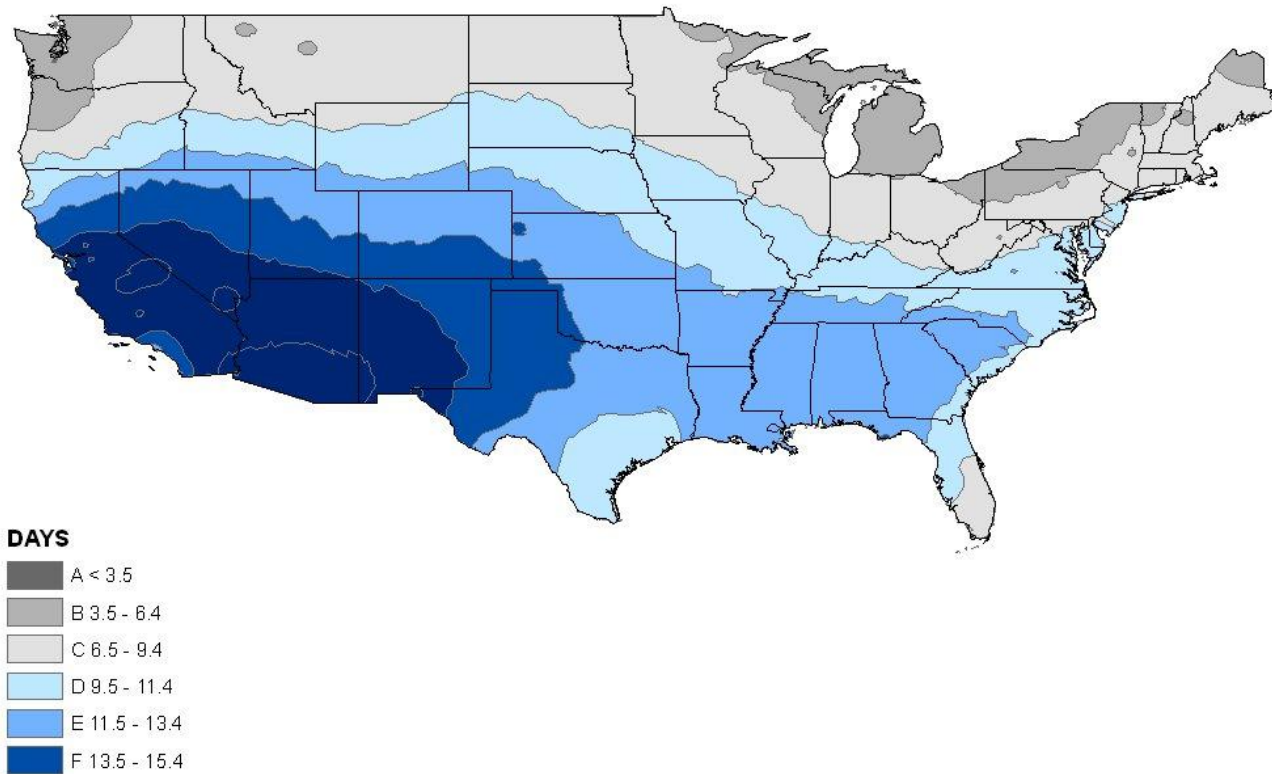


Mean Clear Days in September



# Factors Affecting Acquisition

Mean Clear Days in October



# Factors Affecting Acquisition



Region	Flown	Average Clear Days	2009 Clear Days	Average Weather Factor	2009 Weather Factor	Sun Angle Hours	Actual Suitable Hours	% Suitable Hours
MD	6/1-9/30	20	15	5:1	8:1	976	127.5	13.1%
WV	6/16-10/14	15	4.5	9:1	31:1	976	32	3.3%
Northern VA	5/24-10/6	27	10.5	5:1	13:1	1088	81.5	7.5%
Central VA	5/24-10/6	28	16	5:1	9:1	1040	118	11.3%
Eastern VA	5/24-8/20	20	12	5:1	8:1	712	90.5	12.7%
Western VA	5/24-10/6	18	10	8:1	14:1	1088	77	7.1%
Mountains-VT, NH	7/1-9/14	15	11	5:1	7:1	496	57.5	11.6%
Coastal-NH,ME	7/1-8/31	12	20	5:1	3:1	504	157	31.2%
Central ME	6/15-8/31	16	18	5:1	4:1	632	148	23.4%
Northern ME	6/15-8/31	15	14	5:1	5:1	624	114	18.3%

# Factors Affecting Acquisition



- Flight Restrictions around DC Region
  - Visited with DC ATC center at start of program
  - Controlling space over eastern VA, the WV panhandle, MD and DE
  - “busiest center in the U.S.” – expect denials
  - Unique restrictions: I.E. Our acquisition platforms could be no closer than 80 miles from one another
  - ATC frequently denied access or interrupted what were potentially productive flight opportunities
  - Frequent TFR’s were put in place for reasons ranging from naval exercises and presence of Gov’t officials, (including President), to major public events such as NASCAR racing

# Factors Affecting Acquisition

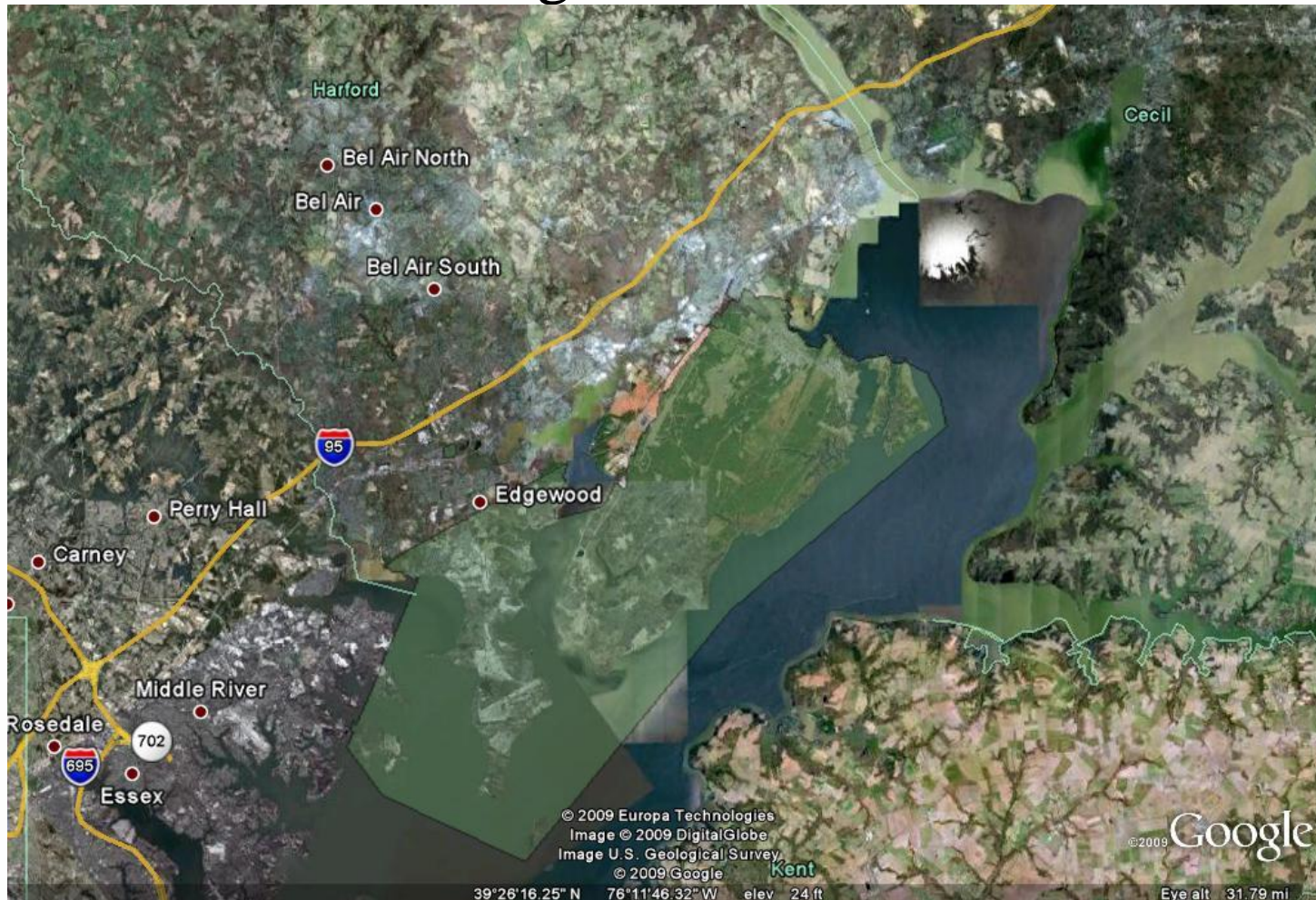


- Flight Restrictions – Military Zones
  - High concentration of military restricted flying zones requiring coordination with base command at specific locations
  - Allowed to fly when base was “cold”
  - Aberdeen Proving Grounds only allow over-flight with an army security officer on-board to ensure no imagery is collected that will cover any part of the grounds
  - Elected not to over-fly, required a buffer zone for turns
  - Shapefile was provided by army security with the advisement to remove any imagery that may have been captured



# Factors Affecting Acquisition

- Aberdeen Proving Grounds



# Lessons Learned 2009 NAIP

- Subcontractor management
  - Best approach - limit subcontracting to acquisition support only
  - Any ortho processing subcontractor will be required to submit a test area from previous year's imagery prior to contracting
  - With only 30 days to process, progress must be shown within 7 days of flight window close
  - Flight subcontractors – some very dependable...some flighty, tend to take off!
  - Back-up plan for all resources saved the day
  - Have made decisions on future subcontracting plans based on this year's experience
- Radiometry
  - Benefited from the applying mean value as opposed to peak as in previous years
- Workflow management
  - Moved more of the radiometry adjustment further up in the workflow
  - Plan to standardize this practice and provide all image acquisition participants with expectations for level of processing prior to delivery to production facility
  - Maintain as much continuity as possible with personnel assignment to the program
- Can gain significant efficiencies by consolidating processing efforts
  - Do all of the initial radiometric adjustment at one location
- More frequent communication with USDA was helpful

# Going into 2010

- Make better utilization of upgraded infrastructure in Colorado Springs
  - Under-utilized available IT capacity
  - Over 700 TB of storage
  - Dedicated servers on GB network
- Plan on a more consolidated image processing effort
  - Redundant capacity for all post-acquisition activity at Colorado Springs
- Apply subcontracting lessons learned
  - Proactive management, standardized reporting, highly specific delivery requirements
  - Key flight subcontractors identified
  - Backup subcontractors qualified on previous experience on program
- Can provide image processing capacity of 35,000 to 45,000 DOQQs



# Comments/Suggestions

- Price/DOQQ more level than actual cost to collect
- Task orders of adjacent states a good idea
- When making awards, consideration for contractor's home base
- Establish and document standard dividing lines for large CCMs that have to be segmented to fit on multiple DVDs
- Delivery on internal HD was helpful
  - Consider a standard Drive letter designation
- Meeting radiometry specs sometimes inhibited ability to optimize final output when images were affected by haze
- Consider requiring sample images for color balance benchmarking